

Nos. 22-2069, 22-2070, 22-2071, 22-2072

**United States Court of Appeals
for the Federal Circuit**

MASIMO CORPORATION,

Appellant,

v.

APPLE INC.,

Appellee.

APPEAL FROM THE UNITED STATES PATENT AND TRADEMARK OFFICE,
PATENT TRIAL AND APPEAL BOARD IN NOS. IPR2021-00193,
IPR2021-00195, IPR2021-00208, IPR2021-00209

APPLE INC.'S RESPONSE BRIEF

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February 21, 2023

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Representative Claim 1 of U.S. Patent No. 10,258,266:

1. A noninvasive optical physiological sensor comprising:
 - a plurality of emitters configured to emit light into tissue of a user;
 - a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;
 - a housing configured to house at least the plurality of detectors; and
 - a lens configured to be located between the tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly protruding convex surface when the noninvasive optical physiological sensor worn by the user and during operation of the noninvasive optical physiological sensor.

Appx606.

CERTIFICATE OF INTEREST

Counsel for Appellee Apple Inc. (“Apple”) certifies the following:

1. Provide the full names of all entities represented by undersigned counsel in this case.

Apple Inc.

2. Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities.

Apple Inc.

3. Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities.

None

4. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

Fish & Richardson P.C.: Andrew B. Patrick, Hyun Jin In, Daniel D. Smith, Roberto J. Devoto

5. Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court’s decision in the pending appeal. Do not include the originating case number(s) for this case. Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

***Masimo Corporation, et al. v. Apple Inc.,*
Case No. 8:20-cv-00048 (C.D. Cal.)**

***Certain Light-Based Physiological Measurement Devices and Components Thereof*
Case No. 337-TA-1276 (ITC)**

***Masimo Corp. v. Apple Inc.,*
Case Nos. 22-1631, -1632, -1633, -1634, -1635, -1636, -1637, -1638
(Fed. Cir.)**

***Masimo Corp. v. Apple Inc.,*
Case Nos. 22-1972, -1973, -1975, -1976 (Fed. Cir.)**

6. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

None

Dated: February 21, 2023

/s/ Lauren A. Degnan

Lauren A. Degnan

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STATEMENT OF RELATED CASES

Pursuant to Federal Circuit Rule 47.5, the undersigned counsel states that no other appeal from the same *inter partes* review (“IPR”) was previously before this or any other appellate court. The undersigned counsel is aware of the following pending cases that will directly affect or be directly affected by this Court’s decision in the pending appeal:

- *Masimo Corporation v. Apple Inc.*, Case Nos. 22-1972, -1973, -1975, -1976 (Fed. Cir.)
- *Masimo Corporation v. Apple Inc.*, Case Nos. 22-1631, -1632, -1633, -1634, -1635, -1636, -1637, -1638 (Fed. Cir.)
- *Masimo Corporation, et al. v. Apple Inc.*, Case No. 8:20-cv-48-JVS (C.D. Cal.)

RESPONSIVE STATEMENT OF THE ISSUES

Whether substantial evidence supports the Board's conclusion that the challenged claims would have been obvious to a person of ordinary skill in the art ("POSITA") based on certain combinations of references.

INTRODUCTION

In four detailed Final Written Decisions, the Board thoroughly considered Masimo’s arguments and carefully weighed the evidence, ultimately finding every challenged claim of the Masimo patents at issue unpatentable. On appeal, Masimo would have this Court reconsider countless of the Board’s fact-bound findings concerning the interpretation of the prior art and a POSITA’s background knowledge and motivations. However, the prior art, Apple’s expert testimony, and other evidence constitute substantial evidence supporting the Board’s findings. Although Masimo may disagree with those findings, this Court is not the venue for relitigating these myriad fact-specific issues. Substantial evidence supports the Board’s decisions, which is all this Court needs to affirm as to every challenged claim.

* * *

The issues Masimo raises in this appeal do not materially differ from those already briefed in Appeal No. 22-1631 (consol.).¹ For completeness and to direct the Court to the corresponding portions of the record for the IPRs at issue in these appeals, Apple addresses these arguments again here.

¹ One difference is the Board’s decision not to address all of grounds in Apple’s IPR208 and IPR209 petitions because it concluded the challenged claims were unpatentable on other grounds. Appx239; Appx315. As discussed below, this issue prevents the Court from reversing the Board’s decisions in IPR208 and IPR209.

* * *

RESPONSIVE STATEMENT OF THE CASE

I. MASIMO'S PATENTS

This appeal concerns four Masimo patents sharing a common specification: U.S. Patent Nos. 10,299,708; 10,376,190; 10,258,266; and 10,376,191. These Masimo patents describe data collection systems including noninvasive sensors that communicate with patient monitors. *See Appx391 (2:20-30).*² The systems measure blood constituents or analytes (e.g., oxygen or glucose), or other physiological characteristics such as pulse rate. *See id.*

The specification describes sandwiching a finger between the shells of the device, similar to a conventional pulse oximeter. *See Appx333.* Figure 3C depicts a sensor, comprising an upper emitter shell connected to a lower detector shell. *See Appx393 (5:34-37); see also Appx399 (18:20-32).* The emitter shell houses emitter components (e.g., LEDs). *See, e.g., Appx396 (12:57-64).* The detector shell houses four photodetectors—one underneath each opening. *See Appx400 (19:18-28).* In use, the device emits light of different wavelengths, which passes through the person's finger, into the protrusion via the openings, and ultimately reaches photodetectors. *See id.* Photodetectors capture and measure the received

² In this section, Apple provides representative citations to the '708 patent.

light and output responsive signals to a processor that calculates the user's physiological parameter(s). *See Appx397 (13:60-67).*

Figures 4A through 4C illustrate embodiments of the protrusion:

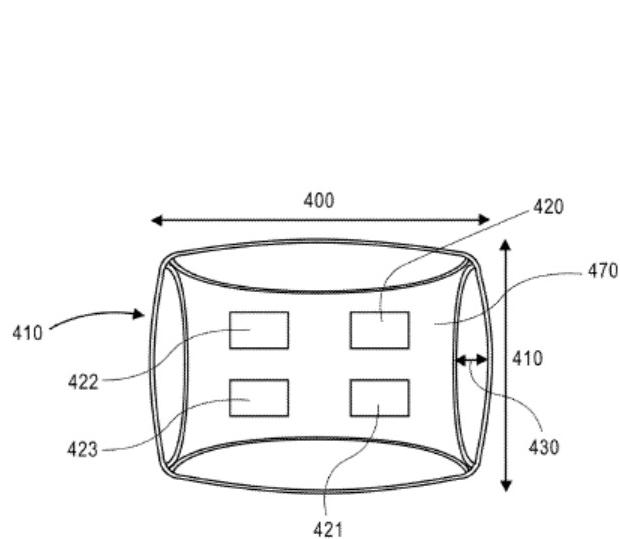


FIG. 4A

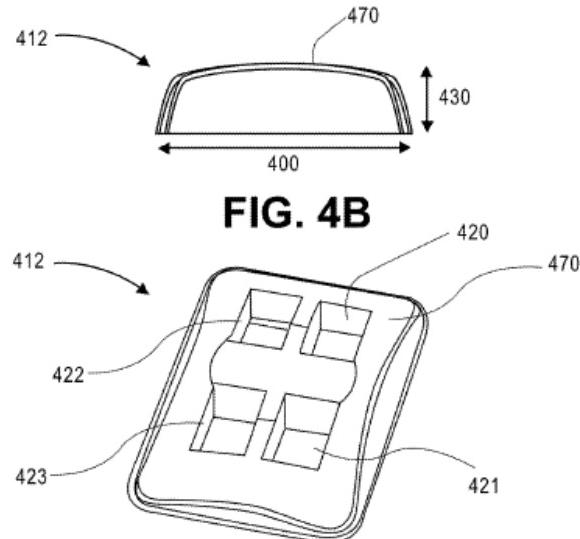


FIG. 4C

Appx337. In these embodiments, the protrusion includes a measurement site contact area 470, which "can be generally curved and/or convex with respect to the measurement site[.]" *Appx402 (23:8-38).* Figure 14D depicts another detector subassembly, in which multiple detectors 1410c are located under a transparent cover 1432 and protrusion 605b. *Appx408 (36:17-28).*

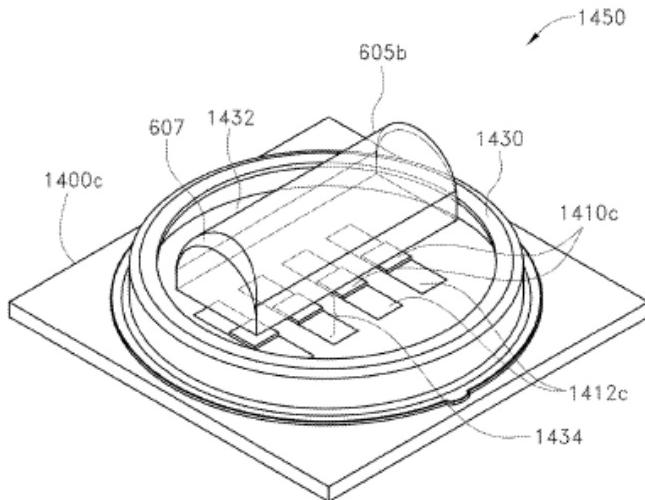


FIG. 14D

Appx363. Protrusion 605b's light-focusing properties may reduce the number of detectors required. Appx408 (35:40-56).

Claim 1 of the '266 patent is illustrative:

1. A noninvasive optical physiological sensor comprising:
 - a plurality of emitters configured to emit light into tissue of a user;
 - a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;
 - a housing configured to house at least the plurality of detectors; and
 - a lens configured to be located between the tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly

protruding convex surface when the noninvasive optical physiological sensor worn by the user and during operation of the noninvasive optical physiological sensor.

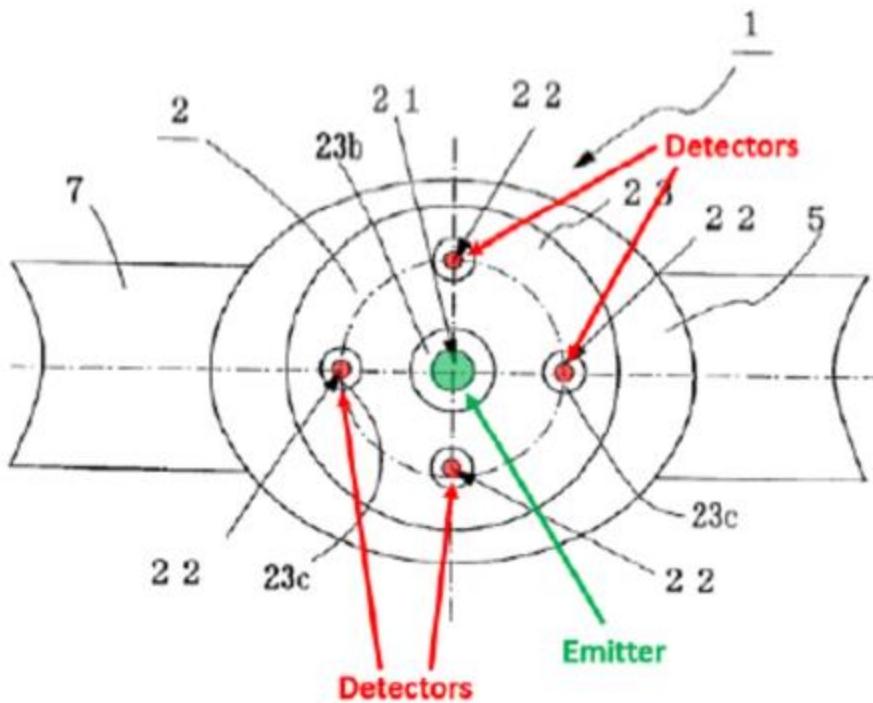
Appx606.

II. THE CLAIMED FEATURES WERE KNOWN IN THE PRIOR ART

The Board relied on multiple combinations of prior art references to cancel the challenged claims. Four references are at issue in this appeal: Aizawa (Appx2397-2403), Inokawa (Appx2404-02426, translation Appx2427-2450), Ohsaki (Appx2507-2512), and Mendelson-1988 (Appx2513-2519).

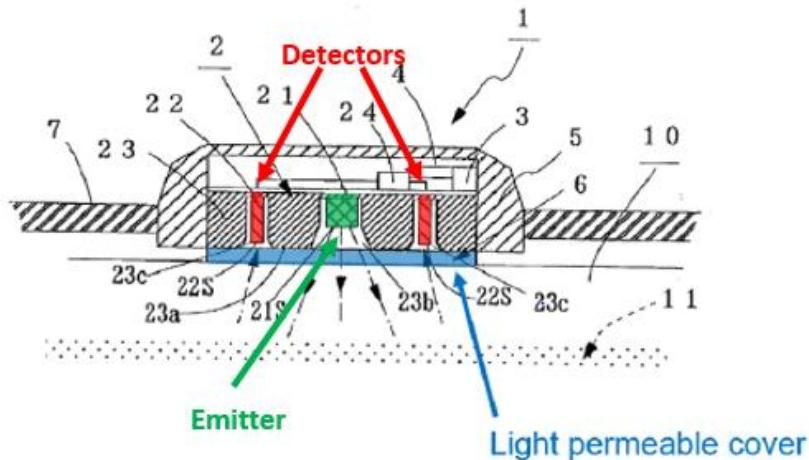
A. Aizawa

Aizawa is a U.S. patent application publication titled “Pulse Wave Sensor and Pulse Rate Detector.” It discloses a wrist-worn sensor, which detects pulse rate based on light output from a light emitting diode and reflected from a patient’s artery. Appx2397-2398. Figure 1A depicts a pulse wave sensor:



Appx2398 (annotations added); *see also* Appx2402 (¶23). The pulse wave sensor includes an LED 21 (green), four photodetectors 22 (red) symmetrically distributed around the LED, and a “holder” 23 for storing these components. Aizawa discloses that increasing the number of photodetectors may improve detection efficiency. *Id.* ¶32; Appx2400 (Fig. 4(a)). Aizawa also describes obtaining the “same effect” in the opposite configuration, *i.e.*, one photodetector surrounded by multiple LEDs. Appx2402-2403 (¶33).

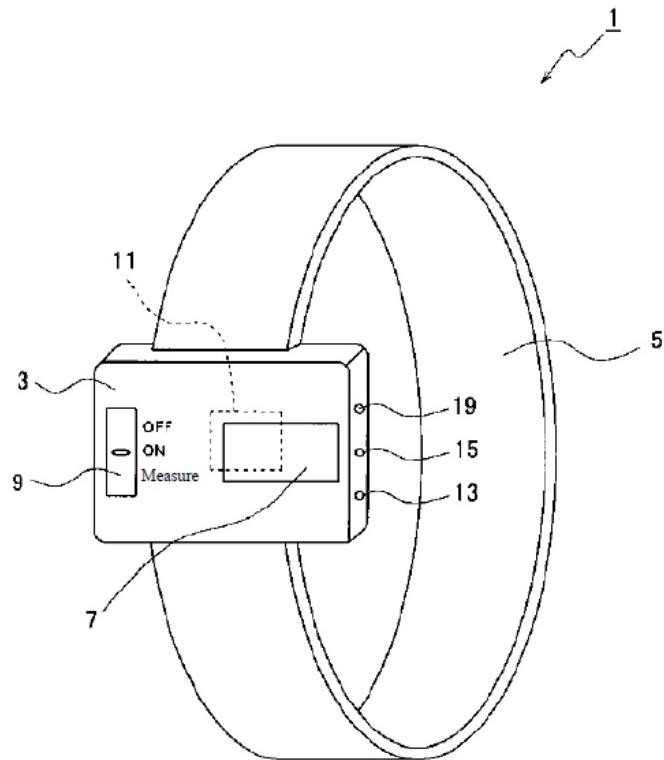
Figure 1B illustrates a cross-sectional view of Figure 1A’s sensor:



Appx2398 (annotations added); *see also* Appx2402 (¶23). The LED and photodetectors “are stored in cavities 23b and 23c.” Appx2402 (¶24). The detection face 23a contacts the user’s wrist. *Id.* The belt 7 “is fastened such that the acrylic transparent plate 6 becomes close to the artery 11 of the wrist,” improving adhesion between the wrist and pulse rate detector. *Id.* (¶26); *see also* Appx2403 (¶34).

B. Inokawa

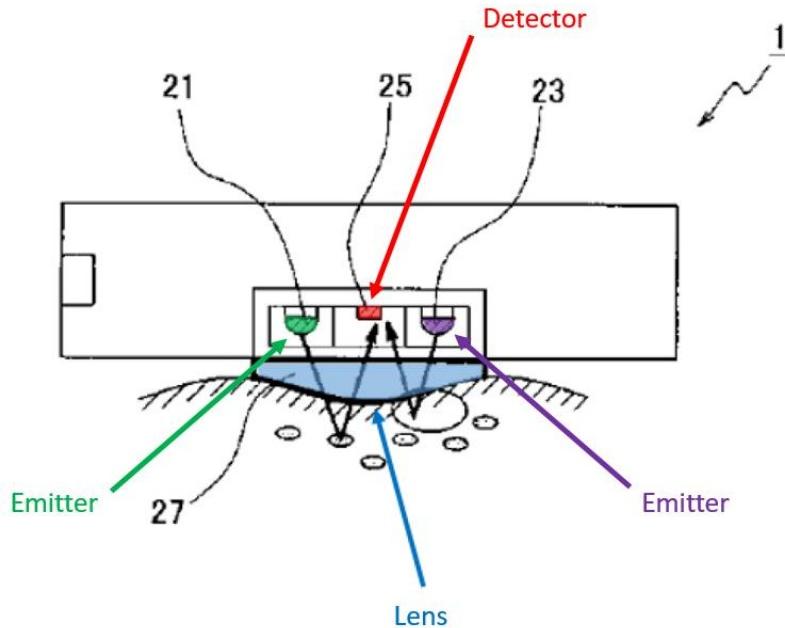
Inokawa is a Japanese published patent application titled “Optical Vital Sensor, Base Device, Vital Sign Information Gathering System, and Sensor Communication Method.” It discloses a wrist-wearable pulse sensor device. Appx2427 (Title); Appx2437 (¶56). Figure 1 illustrates the device:



Appx2445. The pulse sensor 1 includes a sensor unit on a flexible wristband.

Appx2437 (¶57). The sensor unit's top surface includes a display and control switch, while the rear surface includes a component for optically sensing a user's pulse. *Id.*

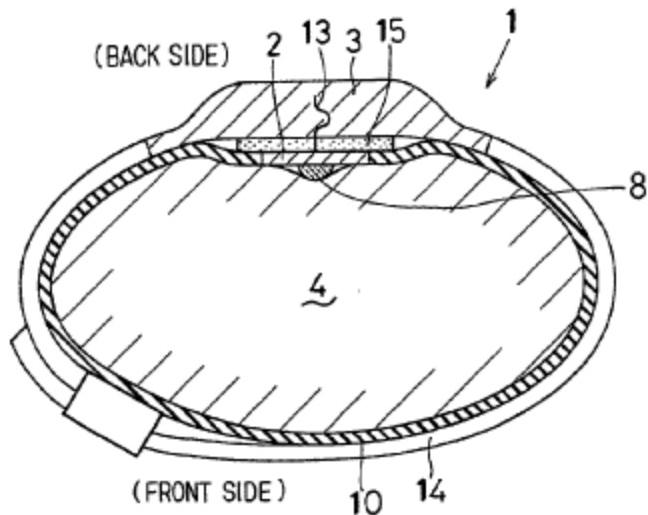
Figure 2 depicts this rear surface:



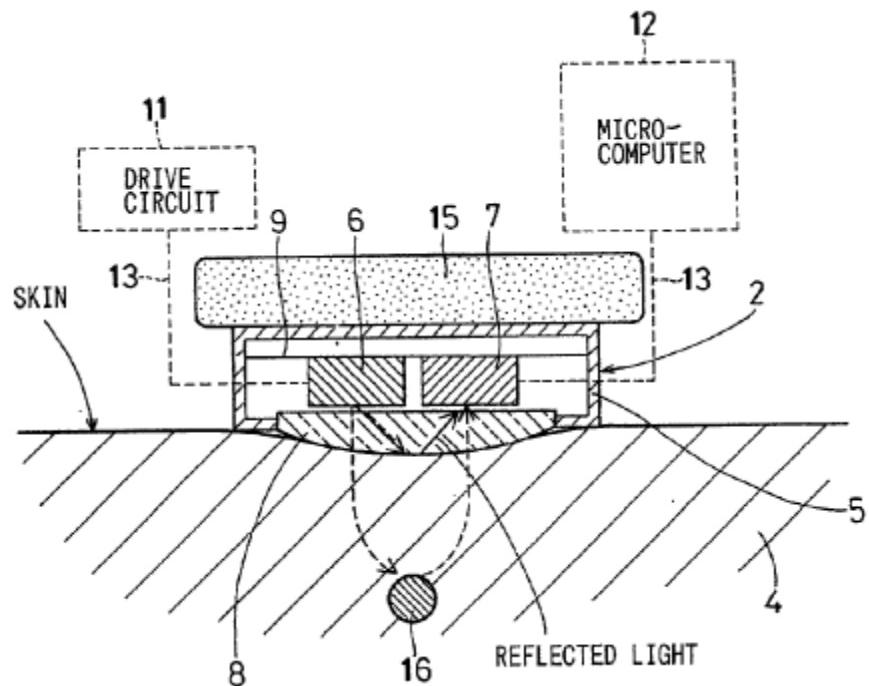
Appx2445 (annotations added); *see also* Appx2437 (¶58). The rear (sensor) side includes two LEDs 21, 23; a photodiode (detector) 25; and a lens 27. *Id.* In various embodiments, Inokawa describes this lens as convex. *See* Appx2441 (¶99); *see also* Appx2442 (¶107). These sensor components help measure a user's pulse and body movement. Appx2437 (¶59). The device stores this information in memory using a CPU. Appx2438-2439 (¶¶68-69).

C. Ohsaki

Ohsaki is a U.S. patent application publication titled “Wristwatch-type Human Pulse Wave Sensor Attached on Back Side of User’s Wrist.” It discloses an optical sensor for detecting a pulse wave of a human body. Appx2507 (Title); Appx2510 (¶3). Figure 1 illustrates a pulse wave sensor 1 wrapped around a user’s wrist 4:



Appx2508; *see also* Appx2510 (¶16). The pulse wave sensor 1 includes a detecting element 2 and sensor body 3. *Id.* Figure 2 illustrates a mechanism for detecting a pulse wave:

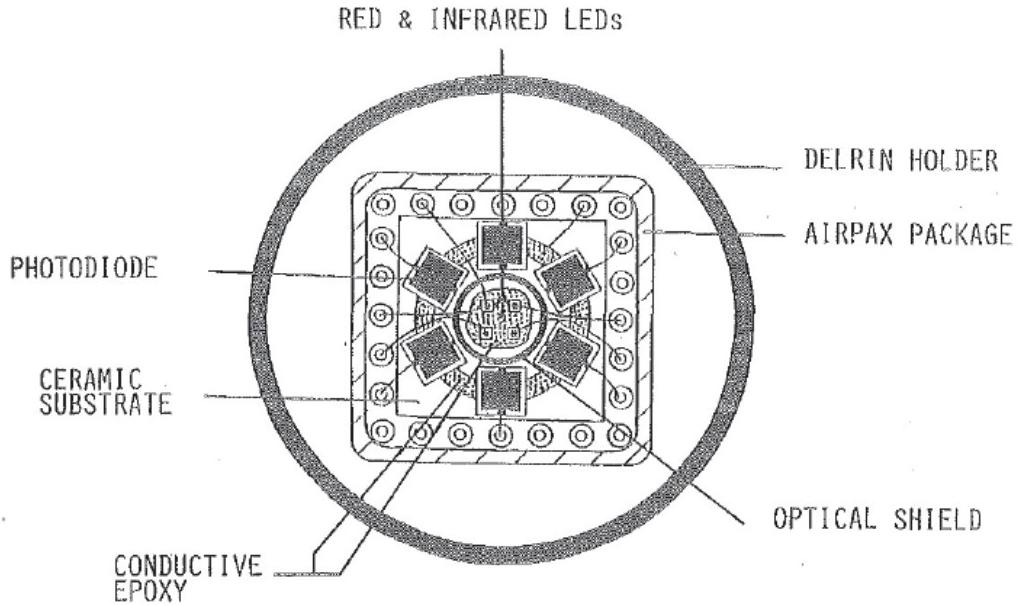


Appx2508; *see also* Appx2510 (¶13). The detecting element includes a light-emitting element 6, light-receiving element 7, and translucent board 8.

Appx2510 (¶17). “A convex surface is formed on the top of the translucent board 8.” *Id.* The translucent board’s convex shape puts it “in intimate contact with the surface of the user’s skin,” preventing the detecting element from slipping off the desired position on the wrist. Appx2511 (¶25). By preventing slippage, this convex surface suppresses “variation of the amount of the reflected light . . . reflected by the surface of the user’s skin.” *Id.* Additionally, the convex surface prevents penetration by “disturbance light from the outside.” *Id.*

D. Mendelson-1988

Mendelson-1988 is an article titled “Design and Evaluation of a New Reflectance Pulse Oximeter Sensor.” It discloses a pulse oximeter to measure a user’s oxygen saturation via the user’s forehead:



See Appx2515 (Fig. 2(A)); see also Appx2513 (Title, Abstract). The sensor includes LEDs that emit light and photodiodes to detect light reflected back to the sensor from the user's tissue. Appx2514. To minimize the amount of interference among the LEDs and photodiodes, an opaque optical shield "was placed between the LEDs and the photodiode chips." *Id.*

III. THE BOARD'S DETERMINATION THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE

Across all four of the Board's Final Written Decisions, no challenged claims survived.³ The following table illustrates the outcome of each IPR:

³ Although the Board found certain claims in certain IPRs were not shown to be unpatentable on some grounds, those same claims were shown to be unpatentable on other grounds.

IPR (Patent)	Claims Shown Unpatentable (Grounds)	Claims Not Shown Unpatentable (Grounds)
IPR193 ('708)	<ul style="list-style-type: none"> • 1-9, 11, 13-15, 19-22, 24-27 (Aizawa+Inokawa) • 16, 27, 28 (Aizawa+Inokawa+Mendelson-2006) • 17, 18, 29 (Aizawa+Inokawa+Mendelson-2006+Beyer) • 10 (Aizawa+Inokawa+Al-Ali) • 1-9, 11-15, 19-26 (Mendelson-1988+Inokawa) 	<ul style="list-style-type: none"> • None
IPR195 ('190)	<ul style="list-style-type: none"> • 1-4, 6-14, 16, 17, 19-23, 26-29 (Aizawa+Inokawa) • 23, 24 (Aizawa+Inokawa+Mendelson-2006) • 25 (Aizawa+Inokawa+Mendelson-2006+Beyer) • 5 (Aizawa+Inokawa+Al-Ali) • 1, 2, 4, 17-22, 26-30 (Mendelson-1988+Inokawa+Mendelson-2006) 	<ul style="list-style-type: none"> • 5 (Aizawa+Inokawa) • 3, 5-14, 16 (Mendelson-1988+Inokawa+Mendelson-2006)
IPR208 ('266)	<ul style="list-style-type: none"> • 1-6, 8-16, 18, 19 (Aizawa+Inokawa) • (Mendelson-1998+Inokawa) 	<ul style="list-style-type: none"> • None

IPR209 ('191)	<ul style="list-style-type: none"> • 1-6, 8-16, 18, 19 (Aizawa+Inokawa) (Mendelson-1998+Inokawa) 	• None
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In IPR208 and IPR209, Apple also challenged claims 1-6, 8-16, 18, and 19 of each patent under Section 103 with references Aizawa, Inokawa, and Ohsaki. Appx239; Appx315. Because the Board concluded these claims were unpatentable on other grounds, it did not reach the merits of that ground. *Id.*

Masimo's arguments on appeal primarily center on whether a POSITA would have been motivated to combine certain subsets of the references above. In each decision, the Board relied extensively on the references themselves and testimony from Apple's expert, Dr. Thomas Kenny, an esteemed Professor at the Department of Mechanical Engineering at Stanford University. *See, e.g.*, Appx2161 (¶6); Appx2201-2210 (¶¶78-89) (Dr. Kenny's first declaration in IPR193 discussing combination of Aizawa and Inokawa); Appx2256-2266 (¶¶167-181) (Dr. Kenny's first declaration in IPR193 discussing combination of Mendelson-1988 and Inokawa); Appx2230-2232 (¶¶123-127) (Dr. Kenny's first declaration in IPR193 discussing combination of Aizawa and Ohsaki); Appx3562-3578 (¶¶7-34) (Dr. Kenny's second declaration in IPR193 discussing combination of Aizawa and Inokawa); Appx3578-3582 (¶¶35-39) (Dr. Kenny's second declaration in IPR193 discussing combination of Aizawa and Ohsaki); Appx3582-

3586 (¶¶41-48) (Dr. Kenny's second declaration in IPR193 discussing combination of Mendelson-1988 and Inokawa).⁴

A. The Board's Decisions Combining Aizawa with Inokawa

In all four IPRs, the Board found that a POSITA would have been motivated to combine Aizawa and Inokawa "to increase the amount of backscattered light that will be received by Aizawa's four peripheral detectors 22, as compared with Aizawa's existing flat cover." Appx36-44; Appx121-129; Appx213-222; Appx290-298. In two of the IPRs, the Board also found that a POSITA would have been motivated to combine Aizawa and Inokawa to improve the pulse measurements recorded by Aizawa's detector and to provide a reliable method of uploading Aizawa's pulse data to another device for display to the user. Appx192-201; Appx269-277.

B. The Board's Decisions Combining Mendelson-1988 with Inokawa

In all four IPRs, the Board applied its reasoning from the Aizawa/Inokawa combination to the combination of Mendelson-1988 and Inokawa, finding that a

⁴ Dr. Kenny submitted similar declarations in each group of IPRs. *See, e.g.*, Appx7512-7520, Appx7545-7547, Appx7570-7577 (excerpts from Dr. Kenny's first declaration in IPR195); Appx8877-8900 (excerpt from Dr. Kenny's second declaration in IPR195); Appx12731-12747, Appx12765-12775 (excerpts from Dr. Kenny's first declaration in IPR208); Appx13763-13789 (excerpt from Dr. Kenny's second declaration in IPR208); Appx17799-17816, Appx17834-17845 (excerpts from Dr. Kenny's first declaration in IPR209); Appx18832-18858 (excerpt from Dr. Kenny's second declaration in IPR209).

POSITA would have been motivated to combine Mendelson-1988 and Inokawa “to increase the amount of backscattered light that will be received by Mendelson-1988’s peripheral detectors.” Appx74-75; Appx149-150; Appx231-232; Appx311.

C. The Board’s Decisions Combining Aizawa with Ohsaki

In IPR193, the Board found that Ohsaki would have motivated a POSITA to add a convex protrusion to Aizawa’s sensor to help prevent slippage on a user’s wrist. Appx51-54.

SUMMARY OF THE ARGUMENT

The Court should reject Masimo’s fact-bound challenges to the Board’s thorough decisions. Masimo disputes that a POSITA would have been motivated to combine the references at issue, but motivation to combine is a question of fact, and the Board’s decisions are supported by substantial evidence.

Substantial evidence supports the Board’s detailed rejection of Masimo’s various arguments against incorporating a convex protrusion into Aizawa (or Mendelson-1988), as taught by Inokawa and/or Ohsaki. First, across all four IPRs, the Board credited Apple’s expert testimony regarding how the combination would improve light collection. It considered Masimo’s arguments that a convex lens protrusion might direct some light rays away from Aizawa’s (or Mendelson-1988’s) detectors, but found persuasive Apple’s expert testimony that any such

effects would be outweighed by the convex shape's light-gathering benefits.

Masimo cannot show that the Board's detailed analysis is unsupported by substantial evidence or the Board's evidentiary and procedural decisions were abuses of discretion.

Second, although Masimo argues a POSITA would not have incorporated Inokawa's second LED into Aizawa, the Board found two independent motivations for doing so: improving pulse measurement and transmitting data using light. For both reasons, the Board credited Apple's expert testimony and found Masimo's unpersuasive. This Court should not re-weigh the evidence.

Third, the Board found that a POSITA would have been motivated to incorporate Ohsaki's convex protrusion into Aizawa to reduce slippage on a user's wrist. The Board thoroughly addressed Masimo's arguments but found a convex shape would incrementally improve adhesion in at least some circumstances, which is sufficient to establish a motivation to combine. Apple's expert testimony provides substantial evidence supporting the Board's findings, and Masimo's procedural arguments fail to show any abuse of discretion.

Masimo's challenges to the Board's factual findings concerning reasonable expectation of success are also without merit. Apple's expert was not required to propose a specific lens design to show that a POSITA would have expected success in implementing the well-known general benefits of using a convex

protrusion, particularly where Masimo’s claims lack such detail. Masimo’s vague argument that Apple’s expert testimony was inadequate fails to articulate any basis for reversal. In addition, many of Masimo’s arguments erroneously assume that Apple’s expert was required to describe the proposed combination with mathematical precision or to physically combine the references. Thus, Apple’s expert testimony provides substantial evidence of a reasonable expectation of success across all four IPRs, and this Court should decline Masimo’s invitation to reconsider these deeply factual issues.

Finally, although reversal is certainly not warranted, it is also not possible for IPR208 and IPR209—even if this Court finds the Board’s decisions raised on appeal were not supported by substantial evidence, it must remand the IPR209 and IPR209 decisions for the Board to reach additional grounds it has not yet considered.

ARGUMENT

I. STANDARD OF REVIEW

Masimo’s arguments on appeal relate to factual determinations on which this Court must defer to the Board and apply the substantial evidence standard. “The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1366-67 (Fed. Cir. 2016) (internal quotations

omitted). Likewise, “[t]he presence or absence of a reasonable expectation of success is . . . a question of fact, which we review for substantial evidence.” *Teva Pharms. USA, Inc. v. Corcept Therapeutics, Inc.*, 18 F.4th 1377, 1381 (Fed. Cir. 2021) (internal quotations omitted). Substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 477 (1951) (internal quotations omitted).

II. SUBSTANTIAL EVIDENCE SUPPORTS THE BOARD’S MOTIVATION TO COMBINE FINDINGS

Despite substantial evidence supporting the Board’s findings, Masimo now asks this Court to re-weigh the evidence, which it should decline to do. *In re NTP, Inc.*, 654 F.3d 1279, 1292 (Fed. Cir. 2011) (“This court does not reweigh evidence on appeal, but rather determines whether substantial evidence supports the Board’s fact findings.”).

A. Substantial Evidence Supports the Board’s Findings that a POSITA Would Add a Convex Protrusion To Improve Light Collection⁵

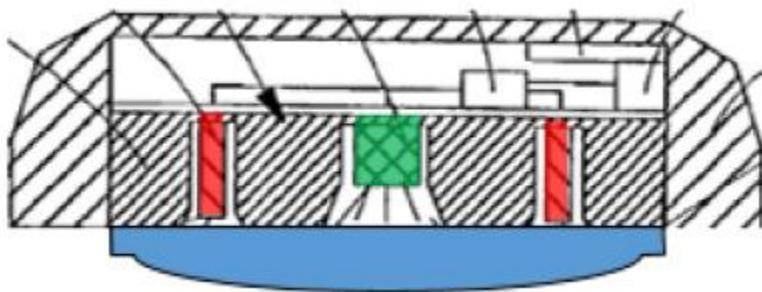
1. Substantial Evidence Supports the Board’s Finding that Inokawa Would Have Motivated a POSITA To Add a Protrusion to Aizawa’s Sensor To Improve Light Collection [IPR193/195/208/209]

The Board found that Inokawa teaches using a convex lens to focus light on light-detecting elements, but Masimo argues this teaching somehow does not apply to Aizawa because its detectors are on the periphery rather than in the center as in Inokawa. Op.Br. 22 (Apple’s combinations “placed the LEDs and detectors in the opposite configuration of Inokawa.” (emphasis omitted)). Because a POSITA is “a person of ordinary creativity, not an automaton,” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007), the Board properly found that a POSITA would have known to modify the protrusion’s shape to account for the locations of the LEDs and sensors. Appx39-40.

The Board fully considered and accounted for Aizawa’s disclosure of detectors at the periphery of the device. *Contra* Op.Br. 22. In analyzing the Aizawa-Inokawa combination, the Board credited Dr. Kenny’s proposed modification, which provides a lens whose curvature is most pronounced at its

⁵ The Board’s analysis of this issue appears at Appx36-44, Appx74-75 (IPR193); Appx121-129, Appx149-150 (IPR195); Appx213-222, Appx231-232 (IPR208); and Appx290-298, Appx311 (IPR209). In this section, Apple provides representative citations to IPR193.

edges, near the detectors. Appx40 (citing Appx2205-2210 (¶¶82-89); Appx3562-3578 (¶¶7-34)). Dr. Kenny's illustration is reproduced below, showing detectors in red, the emitter in green, and the proposed lens in blue:



Appx2207-2208 (¶87).

The Board credited Dr. Kenny's testimony that a POSITA would have understood how to modify Aizawa to add a convex protrusion as taught by Inokawa to increase the light received by the detector, while modifying the protrusion's shape to account for the position of Aizawa's detectors. Appx40 (citing Appx2205-2210 (¶¶82-89); Appx3562-3578 (¶¶7-34)). Rejecting Masimo's argument that the proposed convex lens would not improve light gathering at these peripheral locations, the Board explained that, in the proposed modification, "the lens's curvature is most pronounced at the edges of the lens near the peripheral detectors" and such curvature would cause the relevant diffuse light rays to be directed towards the peripheral detectors in Aizawa. Appx39-40;⁶ see

⁶ Masimo calls this reasoning the "most pronounced curvature" theory. Op.Br. 23-24.

also Appx37-38 (explaining that “backscattered light is diffuse, rather than collimated” and the significance thereof). Substantial evidence supports these findings, including Dr. Kenny’s testimony and principles of physics well-known to POSITAs. *See Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1003 (Fed. Cir. 2016) (relying on expert testimony as substantial evidence).

2. Masimo’s Arguments Against the “Most Pronounced Curvature” Theory Do Not Show Lack of Substantial Evidence for the Board’s Findings

The Board did not err in relying on the so-called “most pronounced curvature” theory,⁷ in which a POSITA would have designed the convex lens such that its greatest curvature is near the detectors thus improving light concentration at those locations. Appx39-40.

As a threshold matter, the Board did not abuse its discretion in considering this theory. Apple’s petitions and Dr. Kenny’s original declaration consistently state that a POSITA would have incorporated a convex lens into Aizawa to increase light-gathering, as taught by Inokawa. Appx1184-1185; Appx2205-2210 (¶¶82-89). Dr. Kenny’s reply declaration merely “further expands” upon this original theory, responding to Masimo’s argument that a convex lens would have directed light away from Aizawa’s sensors and further showing that a convex lens

⁷ In a prior appeal, Masimo referenced the same theory as the “greatest curvature” theory. E.g., Case No. 22-1631, ECF No. 22 at 33-35.

would improve light-gathering, as argued in the petitions. Appx3560; Appx3562-3578 (¶¶7-34); *see also* PTAB Consolidated Trial Practice Guide (Nov. 2019) (“Consolidated Guide”), 73 (“A party also may submit rebuttal evidence in support of its reply.”). This type of expansion of an already-disclosed theory is permissible, particularly where it directly responds to arguments raised by the other party. Appx43; *Provisur Techs., Inc. v. Weber, Inc.*, 50 F.4th 117, 122-23 (Fed. Cir. 2022) (“By concluding that [Petitioner]’s reply evidence properly rebutted [Patent Owner]’s arguments the Board necessarily also determined that Weber didn’t have to submit the evidence with its petition.”); *Chamberlain Grp., Inc. v. One World Techs., Inc.*, 944 F.3d 919, 925 (Fed. Cir. 2019) (“Parties are not barred from elaborating on their arguments on issues previously raised.”).

Substantively, Masimo takes issue (at 25) with the geometric precision it claims the Board ascribed to Apple’s figures. But the Board’s decision does not rest on such geometric precision. Rather, it credits Dr. Kenny’s testimony concerning a widely-known principle of physics, taught in high school—Snell’s law. Appx39-40; Appx3568-3573 (¶¶17-26). The Board then relies on this finding to evaluate Apple’s proposed modification of Aizawa, with the proposed cover shape—where “the lens’s curvature is most pronounced at the edges of the lens near the peripheral detectors”—and finds that the modification “takes Inokawa’s general teaching of a convex protrusion lens to increase the amount of

incoming light directed to a light detector and applies it to the four light detectors of Aizawa.” Appx40 (citing Appx2205-2210 (¶¶82-89); Appx3562-3578 (¶¶7-34)).

Substantial evidence supports the Board’s factual finding that a POSITA would have understood how the curvature of a convex lens protrusion influences a light ray’s path. Appx39-40. Although Masimo suggests (at 34-35) that “specialized education” in optics would have been necessary, the Board credited Dr. Kenny’s testimony that a “POSITA would be familiar with Snell’s law from high school science demonstrations of light passing through prisms, as well as from introductory required physics courses including with their bachelor’s degree programs.” Appx3564-3565 (¶10). That and other testimony credited by the Board constitutes substantial evidence that a POSITA would have known “this general concept of optics.” Appx43-44; Appx2205-2210 (¶¶82-89); Appx3562-3578 (¶¶7-34)). This Court should not re-weigh the evidence. *NTP*, 654 F.3d at 1292.

Finally, Masimo argues (at 31-32) that the Board “failed to explain why the ‘most pronounced curvature’ theory would have led a POSITA to place a single protrusion over multiple detectors.” But Aizawa itself includes a single flat cover over four detectors and one emitter. *See* Appx17-19 (citing Appx2398 (Fig. 1B), Appx2402 (¶¶23-26)). Obviousness does not require showing a motivation to

retain claim elements “already present together in a reference.” *Gen. Elec. Co. v. Raytheon Techs. Corp.*, 983 F.3d 1334, 1352 (Fed. Cir. 2020). The Board’s reasonable conclusion that the single flat cover would have been replaced with a single convex cover is eminently clear.

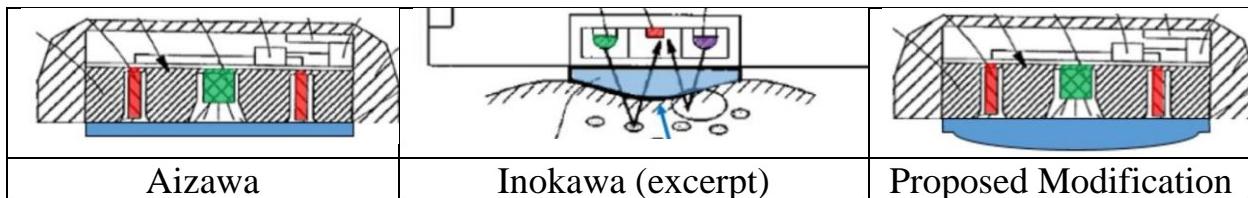
Contrary to Masimo’s assertion (at 35), Apple was not required to identify a prior art reference that discloses “increased light in a physiological sensor at peripheral detectors under a single protrusion” to show obviousness. Masimo appears to confuse the requirements for obviousness with those for anticipation. *Allied Erecting & Dismantling Co. v. Genesis Attachments*, 825 F.3d 1373, 1380-81 (Fed. Cir. 2016) (holding it would have been obvious to modify one reference with the teachings of another). The Board was under no obligation, furthermore, to repeat before rejecting Masimo’s argument that a POSITA may have preferred multiple covers to a single one, Op.Br. 32-34, and its failure to do so does not detract from its unmistakable reasoning. *See Novartis AG v. Torrent Pharms. Ltd.*, 853 F.3d 1316, 1328 (Fed. Cir. 2017) (“The Board is not require[d] . . . to address every argument raised by a party or explain every possible reason supporting its conclusion.” (internal quotations omitted)). Indeed, Masimo’s argument rests on the untenable premise that obviousness requires a showing that the prior art’s combined teachings would constitute an optimal or preferred implementation. E.g., *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (“[O]ur case law does not

require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.”).

3. Dr. Kenny’s So-Called Admissions About the Specific Convex Lens in Inokawa Are Immaterial

Masimo faults the Board for crediting Dr. Kenny’s testimony despite his supposed “admissions” that the specific configuration of Inokawa’s convex lens generally directs light towards Inokawa’s detector, located in the center of the device. *See Op.Br.* 20-23.

As an initial matter, Masimo’s arguments are inapposite because the proposed modification does not bodily incorporate Inokawa’s specific lens (shaded blue in the central figure below), but rather *modifies* its configuration, accounting for the placement of Aizawa’s sensors:



Appx39-40; *see In re Keller*, 642 F.2d 413, 425 (CCPA 1981). The Board plainly understood Masimo’s argument that Inokawa’s specific lens “would direct light toward the center” of Aizawa’s detector 1 where emitter(s) 21 are located, rather than toward the periphery. Appx35; *see also* Appx46. The Board also understood, however, that Apple’s proposed modification was not to use the same lens

configuration depicted in Inokawa's Figure 2. Appx39-40 (depicting shape of cover in modification). Instead, the Board recognized that, although Inokawa's *specific* lens may concentrate light toward its central detector, Dr. Kenny's proposed modification of Aizawa uses a different configuration, "tak[ing] Inokawa's general teaching of using a convex protrusion lens to increase the amount of incoming light directed to a light detector, and appl[ying] it to the four light detectors of Aizawa." Appx40.

The Board likewise understood that Dr. Kenny's previous testimony in a related IPR acknowledged that a convex lens would generally cause incoming light to condense toward the center. Appx30. However, Dr. Kenny further explained that a POSITA "would appreciate that . . . simultaneously, that . . . the general lens-like shape of the convex lens provides refraction which allows additional concentration of light and light-collection efficiency, and that the protrusion provides an opportunity to capture some light that would otherwise not be captured." Appx5088 (205:5-12). Thus, "'there would be *some improvement* in the light concentration at pretty much *all of the locations under the curvature* of the lens.'" Appx5047 (164:8-16); *see also* Appx3572 (¶¶24-25). Thus, Dr. Kenny's testimony is fully consistent and his so-called admissions do not detract from his opinion that a POSITA would have understood the light-gathering benefits of the proposed combination.

Finally, contrary to Masimo’s argument (at 28-29), the Board’s analysis does not rely on interpreting Inokawa’s Figure 2 as disclosing the “precise location” where light would be concentrated. Appx39-40. Rather, the Board credited Dr. Kenny’s testimony that a POSITA would have applied Inokawa’s general teaching of increasing light collection using a convex lens to Aizawa by using a convex protrusion configured to direct light toward Aizawa’s sensors. Appx36-44; Appx2205-2210 (¶¶82-89); Appx3562-3578 (¶¶7-34)). That theory does not depend on the prior art (or Dr. Kenny’s illustrative figures) providing mathematical precision, particularly where the challenged claims do not recite any such detail. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) (considering “the type of detail” in the patent specification). Accordingly, Dr. Kenny’s testimony about the lack of detail in the prior art figures is fully consistent with Apple’s and the Board’s obviousness theory, which is supported by substantial evidence.

4. The Board Did Not Abuse Its Discretion in Considering Nishikawa

Masimo takes issue (at 29) with Apple being “motivated” by or “inspired by” the “specific shape of the convex lens” from Nishikawa (Appx2598-2605) without relying on Nishikawa as a formal ground of invalidity. The Board’s consideration of evidence outside the petition’s formal grounds is a matter within its broad discretion. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1081 (Fed. Cir. 2015).

The Board did not abuse that discretion here because “the nature of Petitioner’s reliance on Nishikawa in support of Ground 1A is explained clearly in the Petition, even if Nishikawa is not listed as a third reference[.]” Appx41. Specifically, Apple’s petition cites Nishikawa and Dr. Kenny’s testimony concerning Nishikawa as part of its analysis regarding the combination of Aizawa and Inokawa. Appx1187-1189 (citing Appx2598-2605, Appx2209-2210 (¶89)). Dr. Kenny explained his illustrative use of Nishikawa in his original declaration. (“[M]any prior art references of this period, ***such as Nishikawa*** (shown below) demonstrate exactly how such a lens shape may be incorporated into a molded cover.”). Appx2209-2210 (¶89). The Board, therefore, concluded that “it follows readily from the Petition that a skilled artisan would have appreciated that Nishikawa’s teachings provide insight as to how ‘the transparent acrylic material used to make Aizawa’s plate can be readily formed into a lens [structure] as in Inokawa.’” Appx41 (quoting Appx1188). The Board did not abuse its discretion.

Masimo further argues (at 29-30) that “[n]o evidence explained why a POSITA would have used Nishikawa’s curvature, which directs ***outgoing*** light from an LED, to design the cover of a physiological sensor monitoring ***incoming*** light.” Dr. Kenny explained, however, that Nishikawa’s lens is simply “a representative example of a manufacturable molded lens with similar optical and

mechanical requirements,” which would “do a good job of obtaining the benefits at a modest cost.” Appx5064 (181:8-16). As the Board recognized, a lens shape like Nishikawa’s would “provide curvature in the lens where it can do the most good,” Appx41 (quoting Appx5062-5063 (179:21-180:13)), by “allow[ing] more light to be gathered and refracted toward the light receiving cavities of Aizawa.” *E.g.*, Appx2207-2210 (¶¶87-89). Masimo is thus incorrect (at 30) to suggest that “no evidence” explains why a POSITA would have used a lens shape like Nishikawa’s.

5. Substantial Evidence Supports the Unpatentability of Dependent Claims Regarding Mean Path Length [IPR195/208/209]

Claims 12 and 14 of the ’190 patent require that “the light permeable cover is configured to reduce a mean path length of light traveling to the at least four detectors.” Appx510 (45:26-36). Claims 6 and 16 of the ’266 and ’191 patents require that “the lens is configured to reduce a mean path length of light traveling to the plurality of detectors.” Appx607 (45:4-7, 46:46:19-21); Appx704 (45:18-20, 46:25-27). Masimo did not argue that these claims were separately patentable below; rather, it discussed them only in the context of incorrectly arguing that that Dr. Kenny’s proposed modification would direct light away from Aizawa’s sensors. Appx130-131; Appx223-224; Appx299-300 (providing no separate argument for the challenged dependent claims). Thus, as a threshold matter, this

Court should limit its review to the argument Masimo “actually presented to the Board” and not separately consider the patentability of these dependent claims. *Novartis*, 853 F.3d at 1329. At a minimum, the Board’s consideration of these dependent claims “was at least commensurate with [Masimo]’s presentation of those issues,” confirming that the Board’s treatment of those claims was adequate. *Id.* at 1327-28.

In any event, substantial evidence supports the Board’s finding that these dependent claims would have been obvious. Dr. Kenny explained that Inokawa’s convex lens would “refract[] and concentrat[e] the light coming in through Aizawa’s acrylic plate.” Appx7517-7518 (¶¶84-85); Appx7532-7533 (¶107). As an example, Dr. Kenny provided illustrations showing how this would reduce the path length of an individual ray of light. Appx7532-7534 (¶¶107-108). The Board adopted his analysis as its own. Appx131. His testimony therefore constitutes substantial evidence supporting the Board’s judgment. *Unwired Planet*, 841 F.3d at 1003.

Although Masimo now argues that Dr. Kenny’s illustrated examples are inadequate because they concern a single ray of light, his *testimony* was not so limited; instead, it was generally applicable to “the light passing through” Aizawa’s modified cover. Appx7532-7533 (¶107); *see also* Appx7517 (¶84); Appx10401-10402 (197:11-198:16) (testifying that the illustrated example was a

“*representative* example” and that “if I repeated this analysis for a multitude of path lengths, I would find that the majority of them would have a shorter path length”). Accordingly, Dr. Kenny’s illustrations of a single light ray are consistent with a reduction in *mean* path length.

Masimo is also wrong that the Board “never squared” the “most pronounced curvature” theory with Dr. Kenny’s testimony for these dependent claims. Dr. Kenny specifically acknowledged that the “refraction effect” of the lens’s convex shape would shift “the distribution of light from the edge toward the center somewhat,” Appx10410 (206:5-21), consistent with his explanation for why Inokawa’s convex lens would reduce the mean path length. Appx7517 (¶84); Appx7532-7534 (¶¶107-108). Dr. Kenny acknowledged (unremarkably) that, as a result, “some [light] rays that would have hit the detectors” would be “refracted away from the detectors.” Appx11533-11534 (19:3-20:8).

However, as noted above, the Board found persuasive Dr. Kenny’s explanation that “Snell’s law indicates that ‘light rays that may have otherwise missed the detection area are instead directed toward that area as they pass through the interface provided by the cover,’ and is especially true ‘in configurations like Aizawa’s in which light detectors are arranged symmetrically about a central light source, so as to enable backscattered light to be detected within a circular active detection area surrounding that source.’” Appx124

(quoting Appx8886-8888 (¶¶23-26)); Appx8878-8879 (¶9) (quoting Appx5047 (164:8-16)). Thus, the Board amply explained why the lens's refracting light somewhat toward the center is fully consistent with also increasing the concentration of light at Aizawa's detectors in the proposed combination.

6. Substantial Evidence Supports the Board's Finding that Inokawa Would Have Motivated a POSITA To Add a Protrusion to Mendelson-1988's Sensor To Increase Light Collection [IPR193/195/208/209]

In all four Final Written Decisions, the Board found that a POSITA would have combined Mendelson-1988 and Inokawa to improve light collection, explaining that its "reasoning is substantially identical to the analysis provided above in connection with the ground based on Aizawa and Inokawa, with Mendelson-1988 replacing Aizawa in the combination." Appx74; Appx149-150; Appx231; Appx311. Substantial evidence, including Dr. Kenny's testimony, supports the Board's finding that a POSITA would have been motivated to combine Inokawa's teaching of a convex protrusion with Mendelson-1988. Appx74 (citing Appx2264-2265 (¶180)).

Masimo says that its arguments with respect to the Aizawa-Inokawa combination apply to the Board's findings regarding Mendelson-1988 and Inokawa, but highlights only that Mendelson-1988's sensor has peripheral detectors. Op.Br. 41-42. As explained above, the Board fully considered Masimo's arguments pertaining to peripheral detectors and found that, in light of

Inokawa's teachings, a POSITA would have been motivated to use a convex lens protrusion, configured to accommodate the detectors' peripheral location, to focus light on the detectors, thereby increasing light collection. Appx73-75 (referencing the Board's prior analysis at Appx36-44); *see also* Sections III.A.1-4, *supra*.

Masimo appears to argue that the Board should have found that Mendelson's later work teaches away from the combination. Op.Br. 41 ("Mendelson's later work demonstrates why placing a protrusion on Mendelson-1988's sensor would have contradicted decades of the thinking in the field."). Yet, Masimo resorts to a reference—Mendelson-799, Appx2618-2619 (2:47-53, 3:27-67)—that is ***not part of the combination*** at issue, confirming that the prior art at issue (Mendelson-1988+Inokawa) does ***not*** teach away. *See Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360 (Fed. Cir. 2017).

B. Substantial Evidence Supports the Board's Findings that Inokawa Would Have Motivated a POSITA To Increase the Number of Emitters in Aizawa's Device [IPR208/209]⁸

The Board found "that a person of ordinary skill in the art would have been motivated to replace Aizawa's single near infrared LED 21 with an infrared LED and a green LED, to provide a reliable method of uploading pulse data stored by Aizawa's wrist-worn pulse rate detector 1 to another device for display to the user

⁸ The Board's analysis of this issue appears at Appx192-201 (IPR208); Appx269-277 (IPR209). In this section, Apple provides representative citations to IPR208.

[because] Inokawa expressly touts such optically-based uploading of data from Inokawa’s wrist-worn sensor 1 to Inokawa’s base device 17 as a benefit of incorporating two emitters in sensor 1.” Appx195. Substantial evidence supports these findings.

1. Neither Aizawa Nor Inokawa Must Individually Disclose Every Claim Limitation

The Board properly rejected Masimo’s argument that the challenged claims are nonobvious because “neither Aizawa nor Inokawa expressly discloses a wrist-worn sensor device that has *both* a plurality of emitters *and* at least four detectors.” Appx198; *see also In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (nonobviousness is not established by attacking references individually when unpatentability is predicated upon a combination of prior art disclosures). Contrary to Masimo’s assertion (at 49), the Board did not find that a POSITA’s “ordinary creativity” supplies any missing limitation. Rather, the Board explained why it was “persuaded that a person of ordinary skill in the art would have been motivated to modify Aizawa’s wrist-worn detector 1 to replace its single near infrared LED 21 with an infrared LED and a green LED, based on Inokawa.” Appx199.

Specifically, the Board found “the combination of Aizawa and Inokawa teaches that having multiple emitters is beneficial, and having multiple detectors is beneficial, for different and not inconsistent reasons.” Appx199. Although

Aizawa discloses an embodiment with four photodetectors and one LED, it describes that arrangement as a non-limiting example, Appx2402 (¶32), further teaching that “[t]he same effect can be obtained” with one photodetector and multiple LEDs. Appx2402-2403 (¶33). Additionally, as Masimo admits, “Inokawa discloses a sensor with two emitters and one detector.” Op.Br. 48 (citing Appx2437 (¶[0058])). The Board explained that a POSITA would have known “to keep all four detectors 22 that are already present in Aizawa’s detector 1, so that ‘[e]ven when the attachment position of the sensor is dislocated, a pulse wave can be detected accurately[.]’” Appx199 (quoting Appx2401 (¶9); Appx2402 (¶27)) (original alteration); *see also Gen. Elec.*, 983 F.3d at 1352 (holding a party showing obviousness need not “re-do the work already done in the prior art reference”).

In charging the Board with error because neither reference alone discloses a device having a plurality of emitters and at least four detectors, Masimo assumes the combination must bodily incorporate Inokawa’s device into Aizawa’s device, violating this Court’s instruction to the contrary. *See, e.g., Keller*, 642 F.2d at 425. As the Board explained, Appx199, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton,” and “in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle,” as is the case here. *KSR*, 550 U.S. at 420-21.

2. A POSITA Would Have Been Motivated To Combine the Teachings To Improve Pulse Measurement

The Board found, crediting Dr. Kenny's testimony, that

a person of ordinary skill in the art, upon reviewing Inokawa's disclosure of using two emitters of different wavelengths to calculate a user's pulse and motion separately, would have understood that these two separate measurements would "allow for a more reliable pulse measurement that takes into account *and corrects for* inaccurate readings stemming from body movement" by "subtracting the 'signal component corresponding to body movement [] from the pulse signal to help better isolate the desired pulse data."

Appx194 (quoting Appx13779-13781 (¶¶36-37)) (original alterations and emphasis); Appx12732-12734 (¶¶71-73). Because Aizawa does not disclose using "computed motion load in this specific fashion," the Board found that a POSITA would have been motivated to apply Inokawa's teachings to "improve upon the accuracy of Aizawa's pulse measurements." Appx194 (citing Appx2401 (¶15); Appx2403 (¶28); Appx2403 (¶35)).

Masimo faults the Board's reasoning for allegedly relying on a function already achieved by Aizawa. *See* Op.Br. 49 ("Aizawa already provides a 'device for computing the amount of ***motion*** load from the pulse rate." (citing Appx2401 (¶15); Appx15039 (¶84); Appx20108 (¶84)) (original emphasis)). However, the Board correctly found that Aizawa does not disclose ***using*** a separately-computed motion load in the way taught by Inokawa—to help isolate the desired pulse data better while correcting for inaccurate readings related to body movement.

Appx194 (citing Appx2401 (¶15); Appx2402 (¶28); Appx2403 (¶35)). The Board credited Dr. Kenny’s testimony that a POSITA would understand that using two LEDs to calculate a user’s pulse and motion *separately* would enable the device to calculate a “more reliable” pulse rate. Appx194 (citing Appx13779-13781 (¶¶36-37); Appx12732-12734 (¶¶71-73)). As a result, this is markedly different than *Kinetic Concepts*, where there was no expert testimony on the motivation to combine, and “[t]he record [was] devoid of any reason someone would combine these references.” *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1369 (Fed. Cir. 2012).

Masimo’s complaint (at 49) about Dr. Kenny’s citation to Nanba is irrelevant. Although the Board cited the portion of Dr. Kenny’s declaration that discusses Nanba, Dr. Kenny himself did not rely *solely* on Nanba for his opinion; he also relied on Inokawa and the POSITA’s knowledge. Appx192-195; Appx12732-12734 (¶¶71-73) (citing Nanba (Apple-1010) intermittently when discussing Aizawa, Inokawa, and a POSITA’s knowledge). The Board further noted that Dr. Kenny’s specific testimony regarding a POSITA’s motivation “to *improve*” pulse rate measurements by using a separate motion measurement “stands unrebutted” because Masimo’s expert “sets up a straw man to attack, rather than directly addressing the entirety of Dr. Kenny’s testimony.” Appx194-195 (original emphasis). This unrebutted testimony is substantial evidence supporting

the Board's findings. *See Acoustic Tech., Inc. v. Itron Networked Sols., Inc.*, 949 F.3d 1366, 1374 (Fed. Cir. 2020).

3. A POSITA Would Have Been Motivated To Combine the Teachings To Reliably Upload Pulse Data

The Board independently found that a POSITA would have been motivated to combine Aizawa's and Inokawa's teachings to reliably upload pulse data from Aizawa's detector to another device for display. Appx195. The Board relied on Inokawa's explicit teaching that using two emitters allows optically-based data uploading, which has two distinct benefits: (1) "increas[ing] the accuracy of data transmission," and (2) "obviat[ing] the need for providing a special wireless communication circuit in the wrist-worn sensor or a communication cable." Appx195-196 (cleaned up).

Masimo disputes this finding because Inokawa transmits information by LED light (optical transmission) to a base device, whereas Aizawa allegedly uses a wireless transmitter (radio frequency communication) "for real-time heart rate measurements during exercise." Op.Br. 50. However, in seizing on Inokawa's "cumbersome base-station approach," *id.*, Masimo assumes the legally erroneous premise that the combination must bodily incorporate Inokawa's device into Aizawa's device. *Keller*, 642 F.2d at 425.

Moreover, Masimo's argument rests on a factual interpretation of Aizawa that the Board reasonably rejected. The Board found that "Aizawa does not

describe exactly how transmitter 4 transmits its data to another device.” Appx196. Even assuming, *arguendo*, that Aizawa “contemplates radio frequency communications,” the Board found that displaying real-time pulse data during exercise was *not* a goal emphasized or even disclosed by Aizawa. Appx196-197 (citing Appx2401 (¶¶4, 6, 15)). The Board’s finding is supported by substantial evidence, including Aizawa’s disclosure that heart-rate is **measured** in real-time contrasted with its silence as to when pulse rate data is **transmitted** for display. Appx2401 (¶¶4, 15).

Finally, even if the combination has disadvantages, the Board’s additional findings foreclose Masimo’s argument. Specifically, the Board found that Inokawa teaches that, in at least some cases, any “benefits achieved” by Aizawa’s alleged real-time transmission “can be outweighed by obviating the need for the wrist-worn sensor to include a special wireless circuit.” Appx197-198. That independently supports the Board’s motivation-to-combine finding. *In re Urbanski*, 809 F.3d 1237, 1243-44 (Fed. Cir. 2016) (POSITAs may be “motivated to pursue the desirable properties taught by [one reference], even at the expense of foregoing the benefit taught by [another].”); *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 796 (Fed. Cir. 2021) (affirming the Board’s weighing of tradeoffs).

C. Substantial Evidence Supports the Board’s Finding that Ohsaki Would Have Motivated a POSITA To Add a Convex Protrusion to Aizawa To Improve Reduce Slippage [IPR193]

Substantial evidence supports the Board’s factual finding that Ohsaki would have motivated a POSITA to add a protrusion to Aizawa’s sensor to improve adhesion and help prevent slippage.⁹ E.g., Appx51 (“A person of ordinary skill in the art would have understood from Ohsaki that forming a convex protrusion on the face of an optically-based pulse sensor where it is pressed against the user’s wrist to gather optical data will beneficially prevent slippage of the sensor during operation.”).

As the Board recognized, Ohsaki itself states that its convex surface is “in intimate contact with the surface of the user’s skin,” preventing the detecting element from slipping off the user’s wrist. Appx51-52 (quoting Appx2511 (¶25)). The Board credited Dr. Kenny’s testimony that a POSITA would have understood “that the advantages of a light permeable protruding convex cover could apply . . . regardless of where on the body such a convex cover was placed.” Appx3579-3580 (¶37). It also credited Dr. Kenny’s opinion that “adding a convex surface to Aizawa” would “*improve* its tendency to not slip off” because “it is well

⁹ Apple raised this adhesion-based motivation to combine in IPR208 and IPR209 with respect to claims 1-6, 8-16, 18, and 19 of each patent under Section 103 with references Aizawa, Inokawa, and Ohsaki. Appx11825-11827; Appx16970-16972. Because the Board concluded these claims were unpatentable on other grounds, it did not reach the merits of that ground. Appx239; Appx315.

understood that physically extending into the tissue and displacing the tissue with a protrusion provides an additional adhesive effect.” Appx3580 (¶37) (original emphasis).

Masimo challenges the Board’s finding that the combination could work with a sensor on either the wrist’s front (palm) side or its back side. *E.g.*, Op.Br. 35-41. But the Board properly rejected Masimo’s argument that Apple should be limited to the location of Aizawa’s sensor (on the wrist’s palm side) because Apple’s combination does not propose bodily incorporation of Ohsaki’s protrusion into Aizawa’s device. Appx49; *see also Keller*, 642 F.2d at 425. The Board thus did not abuse its discretion in rejecting Masimo’s demand to restrict the sensor’s location. Nor was it “Apple’s burden to show *Ohsaki disclosed* some benefit to using a protrusion at Aizawa’s *palm-side* location,” Op.Br. 37, as Masimo suggests. Apple’s obviousness theory was not limited to the palm-side location; moreover, a motivation to combine need not be expressly taught *in the references themselves*. *E.g.*, *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000) (“[T]he suggestion to combine need not be express and may come from the prior art, as filtered through the knowledge of [a POSITA].” (internal quotations omitted)).

In any event, the Board credited Dr. Kenny’s opinion the combination would work on either side of the wrist. Appx51-53. The Board explained that Ohsaki’s

device “incorporates a convex protrusion in both instances”—*i.e.*, whether attached to the back or front side of the wrist—and that Ohsaki teaches such a convex cover “results in improved performance over” a flat cover, “especially when the user is moving,” thus indicating an improvement in both instances. Appx53. In making this finding, the Board relied on Dr. Kenny’s testimony that a convex protrusion will prevent slipping by extending into and displacing the tissue of the wrist. Appx53 (citing Appx3579-3580 (¶37)).

Contrary to Masimo’s assertion (at 36-38), the Board accounted for Ohsaki’s disclosure that its protrusion has a “tendency to slip off” on the palm-side, explaining that, “[b]ecause the tested device incorporates a convex protrusion in both [front- and back-side] instances, Figures 3A-3B do not support Dr. Madisetti’s conclusion that ‘Ohsaki teaches that a convex surface on the palm side of the wrist would not prevent slipping’—particularly in comparison to a flat surface such as Aizawa’s.” Appx53.

Masimo itself admits that “Ohsaki does not show that a convex protrusion would provide ***no*** benefit on the palm-side.”” Op.Br. 37 (quoting Appx52-53). And, the challenged claims “are not limited to detection during movement or exercise.” *Id.* Thus, Apple did not need to show a benefit in all locations under all circumstances to establish a motivation to combine. *Cf. Medichem, S.A. v. Rolabo,*

S.L., 437 F.3d 1157, 1166 (Fed. Cir. 2006) (affirming where prior art taught “tertiary amine *sometimes* works to improve the yield” (original emphasis)).

Finally, Masimo’s suggestion (at 40-41) that the Board improperly developed its own theory concerning adhesion is without merit. In finding that Aizawa’s adhesion is provided by its acrylic material rather than the flat shape of its cover, the Board was not developing a new obviousness theory, but simply explaining why it declined to give weight to Dr. Madisetti’s testimony. Appx53-54. The Board is permitted—indeed, required—to ascertain when an expert’s testimony contradicts the plain teaching of a reference. *Apple Inc. v. MPH Techs. Oy*, 28 F.4th 254, 262 (Fed. Cir. 2022) (“The Board [i]s free to reject [an] expert’s testimony based on a lack of factual support.”).

Accordingly, Masimo’s highly factual wrist-location arguments provide no basis to overturn the Board’s motivation-to-combine finding. Substantial evidence supports the Board’s findings that a POSITA would have been motivated to modify Aizawa’s device to include a convex protrusion to improve adhesion and prevent slippage.

III. SUBSTANTIAL EVIDENCE SUPPORTS THE BOARD'S FINDINGS THAT A POSITA WOULD HAVE HAD A REASONABLE EXPECTATION OF SUCCESS IN COMBINING AIZAWA OR MENDELSON-1988 WITH INOKAWA¹⁰

Masimo argues the Board erred in finding that a POSITA would have had a reasonable expectation of success in combining Aizawa or Mendelson-1988 with Inokawa. *See Op.Br. 42-46.* Substantial evidence supports the Board's factual findings concerning these "question[s] of fact." *PAR Pharm. Inc., et al. v. TWI Pharms.,* 773 F.3d 1186, 1196 (Fed. Cir. 2014); *see also BTG Int'l Ltd. v. Amneal Pharms. LLC,* 923 F.3d 1063, 1074 (Fed. Cir. 2019).

Masimo's argument regarding reasonable expectation of success stems from its disagreement with Dr. Kenny's testimony about improving light collection.¹¹ *See Op.Br. at 42-46.* However, the Board "rel[ied] on Dr. Kenny's testimony that a person of ordinary skill in the art would have understood that by positioning a lens above the optical components of Aizawa . . . the modified cover will allow more light to be gathered and refracted toward the light receiving cavities of Aizawa, thereby further increasing the light-gathering ability of Aizawa beyond

¹⁰ The Board's analysis of this issue appears at Appx44 (IPR193); Appx128-129, Appx151-152 (IPR195); Appx200-201, Appx221-222 (IPR208); and Appx277, Appx298, Appx308 (IPR209). In this section, Apple provides representative citations to IPR193.

¹¹ Masimo does not address a POSITA's expectation of success at improving adhesion in the Aizawa/Ohsaki combination, nor does it dispute that a POSITA would have a reasonable expectation of success with respect to including multiple emitters in the Aizawa/Inokawa or Mendelson-1988/Inokawa combinations.

what is achieved through the tapered cavities, and would have found it obvious to combine the teachings of Aizawa and Inokawa such that the flat cover (left) of Aizawa is modified to include a lens/protrusion (right) as per Inokawa in order to increase the light-gathering ability.” *E.g.*, Appx44 (citing Appx2207-2208 (¶87); Appx5062-5063 (179:21-180:13); Appx5085 (202:11-20)). This expert testimony is substantial evidence of a reasonable expectation of success. *Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1294 (Fed. Cir. 2018) (affirming “the Board’s fact-finding as to a lack of reasonable expectation of success” based in part on expert testimony). Masimo’s retort to this evidence (at 54) is merely to reiterate its flawed assertion that the Board abused its discretion in considering it. *See Sec.II.A.4, supra.*

Masimo faults Dr. Kenny for not explaining to its satisfaction “how a POSITA would have balanced the effects of the ‘additional light-capture’ theory with the convex surface’s ordinary light ***condensing*** function that directs light away from the peripheral detectors.” Op.Br. 43 (citing Appx5089-5090 (206:22-207:10)). But Dr. Kenny’s testimony indicates that striking this balance would have been within the level of skill in the art, who would understand that “the reflection of this light by the user’s wrist tissue randomizes the propagation direction of the reflected light rays.” Appx36; *see also* Appx3571-3577 (¶¶23-32); Appx6213-6215 (20:9-22:18) (Dr. Kenny’s testimony from another, related

IPR, submitted by Masimo); Appx6406-6408 (213:12-19, 214:6-215:6) (same).

The Board implicitly adopted this conclusion in finding that a convex protrusion would “increase the amount of backscattered light that will be received by Aizawa’s four peripheral detectors,” Appx36, and by basing its reasonable expectation of success finding on Dr. Kenny’s testimony. *E.g.*, Appx44. Thus, the Board’s ““path may reasonably be discerned,”” which is sufficient to ““uphold [its] decision.”” *See, e.g., Yeda Rsch. v. Mylan Pharms., Inc.*, 906 F.3d 1031, 1047 (Fed. Cir. 2018) (quoting *In re NuVasive*, 842 F.3d 1376, 1383 (Fed. Cir. 2016)).

Similarly, Masimo faults Dr. Kenny for not addressing “numerous complex factors” or providing specific “details of the curvature design.” Op.Br. 44.¹² The asserted patents fail to provide the detail Masimo demands from the prior art. This parallel level of detail is additional evidence¹³ supporting the Board’s findings of reasonable expectation of success. *See Epstein*, 32 F.3d at 1568 (“[T]he Board’s

¹² Masimo claims (at 44) Dr. Kenny admitted the benefit of a curved lens would not be obvious, but Dr. Kenny merely questioned whether Inokawa contemplates the hypothetical scenario posed during his deposition. *See* Appx4969-4973 (86:1-90:21); *see also* Appx5214-5218 (331:1-335:18).

¹³ Recall that Dr. Kenny further explained that a POSITA “would appreciate that . . . simultaneously, that . . . the general lens-like shape of the convex lens provides refraction which allows additional concentration of light and light-collection efficiency, and that the protrusion provides an opportunity to capture some light that would otherwise not be captured.” Appx5088 (205:5-12). Thus, ““there would be **some improvement** in the light concentration at pretty much **all of the locations under the curvature** of the lens.”” Appx5047 (164:8-16); *see also* Appx3572 (¶¶24-25).

observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board’s finding that one skilled in the art would have known how to implement the features of the references.”).

IV. MASIMO PRESENTED NO OBJECTIVE EVIDENCE OF NONOBVIOUSNESS TO THE BOARD

Masimo vaguely suggests that its inventions achieved commercial success, *e.g.*, Op.Br. 1; overcame industry skepticism, *see* Op. Br. 41 (arguing that Mendelson-1988+Inokawa “would have contradicted decades of thinking in the field); or achieved recognition, *e.g.* Op.Br. 5. However, throughout all four IPRs, Masimo presented no evidence or argument concerning objective evidence of nonobviousness to the Board. Appx11; Appx100; Appx179; Appx256. Because Masimo “did not ask the Board to make any factual determinations” on these issues, this Court should reject Masimo’s puffery. *Mobility Workx, LLC v. Unified Patents, LLC*, 15 F.4th 1146, 1152 n.2 (Fed. Cir. 2021).

V. EVEN IF THIS COURT AGREES WITH MASIMO, REMAND IS THE ONLY OPTION

In IPR208 and IPR209, Apple also challenged claims 1-6, 8-16, 18, and 19 of each patent under Section 103 with references Aizawa, Inokawa, and Ohsaki. Appx239; Appx315. Because the Board concluded these claims were unpatentable on other grounds, it did not reach the merits of that ground. *Id.* Even if this Court

finds the Board's decisions raised on appeal are not supported by substantial evidence, it cannot reverse as to IPR208 and IPR209. Instead, it must remand for the Board to reach additional grounds it has not yet considered.

CONCLUSION

For at least the foregoing reasons, this Court should affirm the Board's judgment.

Dated: February 21, 2023

Respectfully submitted,

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CERTIFICATE OF SERVICE AND FILING

I certify that on February 21, 2023, I electronically filed the foregoing **RESPONSE BRIEF** of appellee using the Court's CM/ECF filing system. Counsel for appellant were electronically served by and through the Court's CM/ECF filing system per Fed. R. App. P. 25 and Fed. Cir. R. 25(e).

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CERTIFICATE OF COMPLIANCE

The **RESPONSE BRIEF** of appellee is submitted in accordance with the type-volume limitation of Fed. Cir. R. 32(b). The brief contains 9,166 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(f) and Fed. Cir. R. 32(b)(2). This **RESPONSE BRIEF** has been prepared in a proportionally spaced typeface using Microsoft Word 2016 in Times New Roman, 14 Point.

Dated: February 21, 2023

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